cerre Centre on Regulation in Europe
Improving network and digital industries regulation

HOW FIT IS DSO REGULATION FOR A DECARBONISED EUROPE?

EMPIRICAL ASSESSMENT

SESSION 1

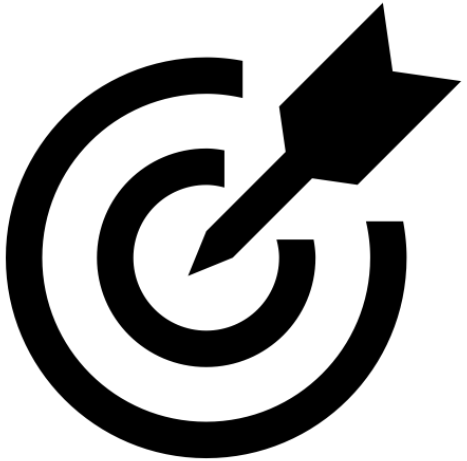
OUTLINE OF THE PRESENTATION

1. Scope and goals of the study (**session 1** – empirical assessment)
2. Surveys (**session 1** – empirical assessment)
3. Short debate (Q&As)
4. Scenarios and proposals for regulation (**session 2** – regulatory pathways)
5. Conclusions (**session 2** – regulatory pathways)
6. Debate (Q&As)

SCOPE AND GOAL OF THE STUDY

- The report aims to suggest **how regulation of the DSO can be improved** in the period to 2025 and beyond.

- Our aim was to investigate whether there are directions in which current regulation might be developed potentially leading to an **improvement in societal welfare**.



SCOPE AND GOAL OF THE STUDY

We set out to investigate **three questions**:

1. How can and should the SO function of the DSO be defined and regulated?
2. What can regulators and EU policymakers learn from TSO regulation that can be translated down to the DSO?
3. How can national regulators and EU institutions support the capacity of the DSO to operate and coordinate the system?

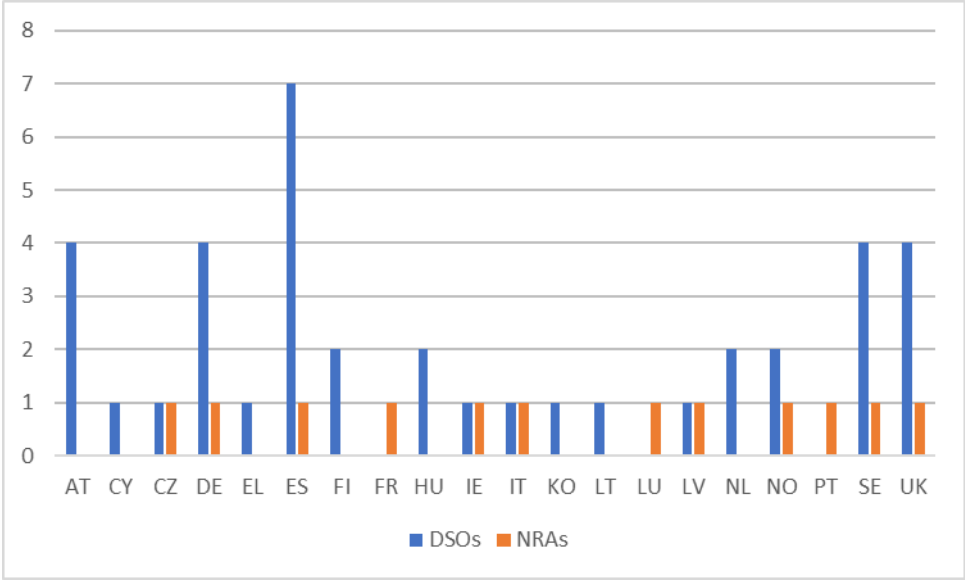
METHODOLOGY

The questions were investigated using **3 approaches**:

1. We conducted **2 parallel surveys** to NRAs and DSOs
2. Drawing on the survey we looked **a set of case studies** of DSOs–covering their–role in:
   - the promotion of EV charging infrastructure;
   - local gas and electricity decarbonisation (sector coupling);
   - promotion of flexibility markets/assets;
   - information provision to facilitate longer-term planning; and
   - smart energy system integration at local/regional level.
3. We developed **5 scenarios** where the role of the DSO might be thought to be important.

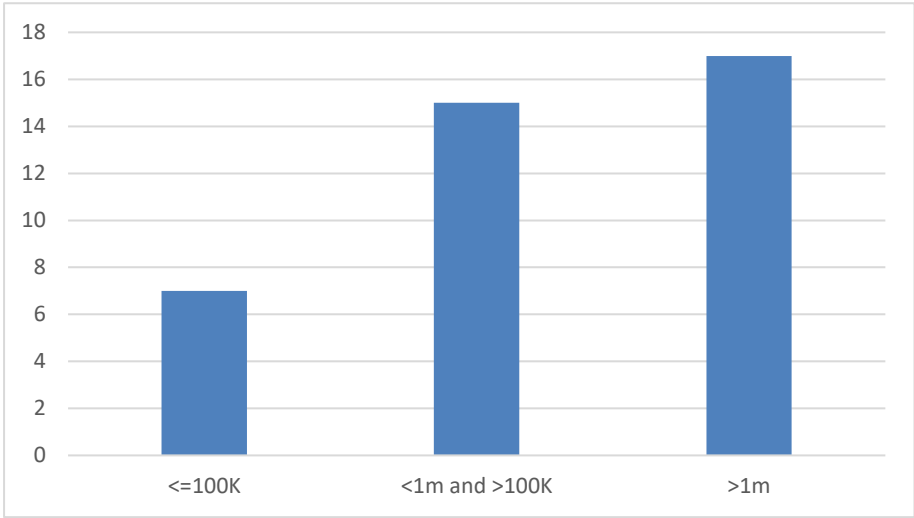
SURVEY PARTICIPANTS

- **51 responses, 20 countries represented** (survey sent to 39 countries).
- 9 countries with responses from both NRA and DSOs.
- Respondents from 12 NRAs and 37 DSOs.
- About 125m customers served by the DSOs, about 225m protected by NRAs who responded.



DSO RESPONDENTS

- 39 responses from DSOs, 17 countries represented.
- 15 DSOs with 1 million or more customers. 15 DSOs with less than 1 million but more than 100K customers. 7 DSOs with fewer than 100K customers.
- We also have responses from 2 energy network associations from the UK and Sweden (added to the large DSOs in the picture).



PROGRESS TOWARDS A MORE ACTIVE DSO

- The move towards a more active role for the DSO remains a **work in progress** for both DSOs and their NRAs.
- There is little evidence that the commitment to an expanded role for DSOs has progressed very far in terms of the quantities of congestion management (MWs) or reactive power (MVars) being procured, apart from in the UK.
- Most DSOs have no competitive procurement of congestion management or reactive power.
- Much research activity is focussed on trials (which are often at early stages and/or small).
- DSOs identify tariff structure and regulatory barriers among the most significant to a more active DSO, while NRAs are most concerned about a lack of potential providers of flexibility and a lack of information on the state of the network.

SUPPORT FOR A MORE ACTIVE DSO AND EU DSO ENTITY

- DSOs and NRAs are **not fully aligned** on how the movement towards a more active DSO should be supported.
- Many **DSOs** want more **regulatory support**.
- **NRAs** remain **uncertain** about the potential for the more active DSO.
- The new EU DSO entity can learn from ENTSO-E and enhance the role of the DSO across the EU and promote flexibility solutions, but...
- ...there is a potential tension between it providing a unified voice for DSOs and promoting a nuanced set of policies which reflects the diversity of DSOs.

KNOWLEDGE OF PROJECTS AND COUNTRY COMPARISON

- NRAs and smaller DSOs seem to be less willing or able to name projects whose results may be worthwhile learning from.
- Only a couple of respondents (1 NRA and 1 DSO) mentioned developments outside of Europe as being of interest.
- Many other DSOs (particularly in the US and Australia) are among the leaders on elements of smart grid development but don't seem to be known or relevant to our respondents.
- A detailed comparison of 6 European countries shows that some countries are making more progress with the active DSO role.
- Our cross-country comparison reveals the positive impact of a more supportive regulatory environment.

EVIDENCE FROM SELECTED CASE STUDIES

- The case studies we considered are all at relatively early stages of development.
- Those that involve demonstrating sector integration (Smart Otaniemi), or sector coupling (the Alliander Hydrogen projects in Oosterwolde and Lochem) remain small pilot projects involving a handful of customers.
- Those that involve all of the DSOs in a country exhibit attempts to more comprehensively address issues concerning data (ENA Digital Systems Map) and electric vehicles (ElaadNL).
- When DSOs work together within a jurisdiction, more significant progress may be possible.

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REGULATORY PATHWAYS

SESSION 2

THE STATE OF KNOWLEDGE

- We outline **5 future of the DSO scenarios.**
- These scenarios cover the role of the DSO in: co-ordinating public EV charging points; decarbonising gas supply in their area; the optimisation of local electricity storage assets; indicative planning; promoting bottom-up innovation.
- **The scenarios allow us to highlight gaps and ambiguities in the Clean Energy Package** with respect to the DSO.

REGULATORY CASE STUDY #1

- ***A local, regional or national government wishes to install a large number of public charging points in its area, could it ask the DSO to do this?***
- The 2019 Electricity Directive (944, Art. 33) only allows DSOs to own and operate EV charging points under certain conditions.
- The following points can be made (see Knezovic et al., 2017):
  - regulatory barriers to the use of EV aggregators and to their flexibility need to be removed;
  - longer-term incentives to innovation need to be given to DSOs;
  - distribution tariffs need to be revised to include energy charges which would benefit the use of EVs;
  - new roles in active grid operation and data management with respect to EVs need to be assigned;
  - and that current regulatory incentives need to be revised in order to fully incentivise the use of the flexibility that EVs might provide.

REGULATORY CASE STUDY #2

- ***A national, regional or local government wants to coordinate the decarbonisation of its electricity and gas systems within its jurisdiction, what role can it ask the electricity DSO to play in this?***

- We note that while the Electricity Directive puts an obligation on electricity DSOs to cooperate with the TSO, there is no requirement to cooperate with gas DSOs or TSOs.

- Oberle et al. (2020) raise the following questions:
  - how is the combined electricity and gas infrastructure expenditure is being allocated?
  - what is the scope for joint optimisation of both networks?

REGULATORY CASE STUDY #3

- ***A single battery array (or other discrete DER asset) could solve all local grid-management problems at 'least cost' without the need for an expensive network upgrade, what should be the role of the incumbent DSO in the provision and operation of this asset?***
- Electricity Directive 2019/944 leaves room for interpretation on what exactly the role of the DSO might be in local energy storage.
- The DSO may be a necessary party in the business model behind a neighbourhood battery (Proka et al., 2020). Several of the examples given by respondents to our survey illustrate this:
  - The Caruna/Fortum storage facility and Elenia/Fortum batteries in Finland;
  - Project Prendt battery involving Linz Netz in Austria.

REGULATORY CASE STUDY #4

- ***Local electricity stakeholders, in particular DER, want guidance on the likely development of the electricity system in their locality over the period of any potential investment in flexibility provision, how should DSO indicative planning be improved?***

- Our survey has highlighted the role of the 10-year development plan which DSOs often produce as part of this improved planning process in order to facilitate a more active network.

- Need for state-of-the-art planning tools to address the move from passive distribution networks to active distribution networks (Klyapovskiy et al., 2019).

- These need to involve a multi-stage process from data collection to the implementation of the plan, which takes account of emerging information and opportunities.

REGULATORY CASE STUDY #5

- ***An NRA and its national and local governments want its DSO(s) to be more innovative and proactive in the energy transition, but what exactly should be the role of the DSO in promoting bottom-up innovation?***
- While the Electricity Directive (2019/944) makes reference to its support for innovative services, innovative pricing and innovative companies, it is silent on the mechanisms for regulators to promote innovation itself.
- Our survey suggests that several NRAs are promoting DSO innovation with both incentives and sandboxes and that a significant number of our surveyed DSOs want more regulatory support for innovation.

CONCLUSIONS

HIGH LEVEL OBSERVATIONS FOR REGULATORS

- It will take time for the Electricity Regulation EU (2019/943) and Directive (2019/944) to have a significant impact on European DSOs (especially as it was drafted in 2016 and pre-dates Net Zero).
- There is little evidence that the active DSO has progressed very far in measurable terms, apart from in the UK.
- There should be a major role for the EU DSO Entity in evaluating, collating and spreading useful information and experiences from projects related to the 'future of the DSO'.
- Our survey suggests there is work for NRAs and DSOs to do in clarifying the best way forward for the DSO.

CONCLUSIONS

AREAS FOR FUTURE DEVELOPMENT

- The Electricity Directive (EU) 2019/944 does not put any requirement on electricity DSOs to cooperate with gas DSOs → there is work to do in this area in the light of emerging European policy towards the future of gas and sector coupling.

- Directive (EU) 2019/944 is potentially open to wide interpretation on the role of the DSO in storage and in EV charging, when its optimal role in different circumstances remains unclear.

- There is also work to do in providing evidence of clear consumer benefit. NRAs need to prioritise evaluation of the evidence on the value of various competitive mechanisms for the procurement of such services.

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